

even the starch-grains contained in its cells, and the mycelium of a parasitic Fungus traversing some of them, were perfectly represented. Its precise origin was unknown: it was said to be probably derived from the London Clay, or from the beds immediately below.—*Proc. Geol. Soc.* March 9, 1870.

*Observations on the Ornithological Fauna of the Bourbonnais during the Middle Tertiary Period.* By M. A. MILNE-EDWARDS.

When I commenced the palæontological investigation of the tertiary strata of the Bourbonnais, I was far from thinking that the birds whose remains are buried in those deposits would furnish clearer and more precise indications as to the general character of the miocene fauna of that part of France than the fossil mammalia and reptiles of the same region. In fact, birds, being endowed with powerful organs of locomotion, are in general less settled than the species belonging to the classes mammalia and reptiles.

When I presented to the Academy my work on the fossil birds of France, there was nothing to justify me in expressing an opinion of this kind; but by pursuing my researches upon this subject I have arrived at new results, which seem to me of great importance and of a nature to enlighten us as to the character of this tertiary fauna better than the palæontological history of the other vertebrate animals of the basin of the Allier, in the present state of our knowledge.

Among the fossil birds the presence of which I have recently ascertained in the tertiary deposits of Saint-Gerand-le-Puy and Langy, there are several which give to this ancient fauna an almost intertropical and, especially, an African character—namely, Parrots, Trogons, Salanganes, Gangas, Marabouts, and Secretaries or Serpent-eaters.

The Parrots constitute a perfectly natural family, well-marked and easily characterized by the structure of the bones as well as by the external form. It occupies the hottest regions in both hemispheres, and has no representatives in the present day either in Europe or in extratropical Asia, or in the part of America situated north of the Gulf of Mexico.

In the tertiary period there existed in France a parrot which, in its osteological characters, differs notably from the Australian types, as also from the maceaws and other American genera, and presents much analogy with certain African species, especially *Psittacus erythacus* of Senegal and South Africa. This tertiary parrot (which I have called *Psittacus Ferreauxii*, and which I shall describe in one of the next parts of my work on fossil birds) is the sole example of a parrot which lived in geological times, and it establishes the first mark of resemblance between the miocene ornithological fauna of the Allier and the existing fauna of Africa.

The Courouneous or Trogons, the plumage of which is not less brilliant than that of the Parrots, now inhabit the hottest parts of the globe; they occur in America, in Asia, and in Africa, but only in

the torrid zone; but I have collected bones undoubtedly belonging to a Trogon in the deposits of Saint-Gerand-le-Puy. These birds usually live in well-wooded places, where they feed on insects; thus the presence of *Trogon gallicus* in the Bourbonnais tends to prove the existence of considerable forests in the vicinity of the lakes of this part of France.

The Gargas or Sandgrouse live at present in Africa and in the warmer regions of Asia: they are only birds of passage in the south of Europe; but they are represented in the ancient fauna of the Allier by a peculiar species, to which I have given the name of *Pterocles sepultus*.

The Salanganes (which have been confounded with the Swallows by most ornithologists, but which really differ therefrom greatly in their mode of organization, and belong to the family of the Swifts or Cypselidæ) now inhabit only India, Cochin China, some of the Polynesian islands, and the Mascarene islands. One species of this group, very nearly allied to the existing species, has left its remains in the tertiary strata of the Bourbonnais.

A large bird of the stork family seems to represent, in this region, the Marabous, which now-a-days occur from the Senegal to Cochin China.

The discovery of a secretary-bird in the midst of this ancient population seems to me very interesting. *Serpentarius* or *Gypogeranus reptilivorus*, which occurs in Africa, from Abyssinia to the neighbourhood of the Cape of Good Hope, is at present the sole representative of a peculiar family of predaceous birds organized for running rather than for flying. Now, as I have shown with regard to the flamingoes, the zoological groups which, at the present day, are represented only by a single species, or by a very small number of species, probably at an ancient period possessed a numerical importance not inferior to that of the other equivalent natural groups. The existence of a second member of the family Serpentariidæ in the miocene epoch therefore seems to me to be an important zoological fact; and the presence of these large birds of prey in France and in Africa at different periods constitutes a new feature of resemblance between the miocene fauna of the Bourbonnais and the existing fauna of the African continent. I have as yet found only a single bone of the foot of this fossil secretary-bird; but the organic characters of this part of the skeleton are so distinct that there can be no uncertainty as to the determination of the type to which the bird from which this fragment was derived belonged.

In my first work on fossil birds, submitted to the Academy in 1865, I showed that at the miocene epoch flamingoes, ibises, and pelicans inhabited the shores of the lakes of the Bourbonnais; but it was necessary, to be very reserved as to the conclusions which might be drawn from these facts with regard to the general character of the ornithological population. The fresh discoveries which I have just made known fully confirm the conjectures which I had formed upon this subject, and lead me to think that, at the period when the lower miocene beds of the Allier were deposited, the biological conditions

in that part of France must have been nearly the same as those which exist now-a-days in certain tropical regions.—*Comptes Rendus*, March 14, 1870, p. 557.

*On the Pancreas in Osseous Fishes, and on the Nature of the Vessels discovered by Weber.* By S. LEGOUIS.

The author indicates, in a few words, the history of our knowledge of supposed pancreatic structures in the osseous fishes, and shows that five years ago the pancreas had been recognized only in two species (*Silurus glanis* and *Esoc lacius*), and supposed pancreatic granulations in about a dozen more. Weber noticed two systems of canals of very different appearance passing from the liver to the intestine in the carp, and imagined that the liver might furnish bile to one set and pancreatic juice to the other. This interpretation was rejected by C. Bernard, who, however, met with the double set of canals in other species.

The author commenced his researches in 1865; and he has examined 43 species, representing the principal families. He finds that Weber's canals exist in all the osseous fishes; they are invisible, like the middle lymphatics, in most species, but sometimes pearly (carp, turbot). They constantly open into the duodenum, near the gall-duct, and often by an ampulla. In some species with a convoluted intestine they acquire a very elegant arborescent form (barbel, grey mullet). Scarcely an intestinal sinus but receives some branchlet of this system; it passes among the pyloric appendages (dory, mackerel), associates its principal trunks with the *ductus choledochus*, the splenic and mesenteric veins, and the portal vein, which it follows into the mass of the liver.

All the osseous fishes possess a pancreas, however its elements may be dispersed, and the Plagiostomi have one similar in all respects to that of other Vertebrata. Among osseous fishes the author distinguishes the following three forms:—

1. *Disseminated pancreas*.—Glandular globules dispersed through the laminae of the peritoneum (barbel, lumpfish, sardine, sand-smelt, loach, &c.).

2. *Diffused pancreas*.—In this the pancreas is lamellar, and resembles that of the rabbit, but forms a glandular web of very much greater tenuity. It is diffused throughout the interstices between the viscera, sometimes to such a degree (*Caranx*) that these are immersed in a pancreatic mass. The author refers to the following species among others as exhibiting this form of pancreas in various modifications:—conger, gurnard, *Sparus*, and stickleback.

3. *Massive pancreas*, resembling the organ in the higher Vertebrata (*Silurus*, pike, eel).

The three forms are associated, at least two and two. Weber's canals are the excretory ducts of the first two forms; and every one of their branches terminates in a gland. In many species the pancreatic and hepatic glands are still in progress when the fish is adult; this explains the apparent penetration of the pancreas into the liver.—*Comptes Rendus*, May 16, 1870, p. 1098.